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# TREES THAT TEMPER THE WESTERN WINDS

Forest Service Library



UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
PRAIRIE STATES FORESTRY PROJECT

WASHINGTON, D. C., JULY 1938





*Top: Southwest of Pierce, Nebr., is this once-valuable farm, now wind-swept and desolate. It's still a habitation, but no longer a home.*

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ILLUSTRATION IS 347811



**T**HE need for trees on the Great Plains has been recognized for more than half a century. Ever since the sod was broken to make way for crops there has been a steady movement of the topsoil by wind erosion.

Sweeping winds that have been known to blow seed and young plants out of the ground—hot, dry winds that strike in critical periods of growth, and the abrasive effects of moving soil particles have contributed to recurring crop failures. With no barriers of trees to resist them, the winds have taken such toll of the fertile topsoil that in many cases lands naturally rich and productive, but without benefit of the original grass cover, have been made unfit for growing crops.

The destructive effect of wind is reduced by windbreaks and shelterbelts. Very little baffling and resistance is necessary to prevent soil from being picked up and carried along by the winds.

Every housewife knows that her laundry dries much quicker when the wind is blowing than when it is calm. It is because the evap-

oration is more rapid. The rate of evaporation varies with the velocity of the wind, which indicates another of the benefits of shelterbelts on the Plains. Increased crop yields have been reported on individual farms from land protected by shelterbelt plantings.

Shelterbelts and other types of farm tree planting may have benefits in addition to their protective effects upon the land. They may make possible the production of crops the culture of which would otherwise be hazardous or impossible. Garden crops and fruits are particularly benefited by them. They may furnish fuel and other timber products for farm use in a region where wood is naturally scarce and expensive. In general, it may be said that such protective barriers are an aid to more diversified farming.

Since 1934 the United States Forest Service has been attacking the wind problem of the prairie-Plains region by planting trees. In North Dakota, South Dakota, Nebraska, Kan-





# THE STORY

## Forestry Project



sas, Oklahoma, and northwest Texas the first shelterbelts set out in the spring of 1935 are already exerting an influence upon the adjacent lands.

The Prairie States Forestry Project was undertaken only after many years of research and experimentation. All the skill of trained foresters has been directed toward assuring its success. The results show quite clearly that trees may be planted successfully in the area if proper procedures are used. Some of the practices used on this project are described briefly on following pages of this publication. The pictures of some of the plantings also tell a vivid story.

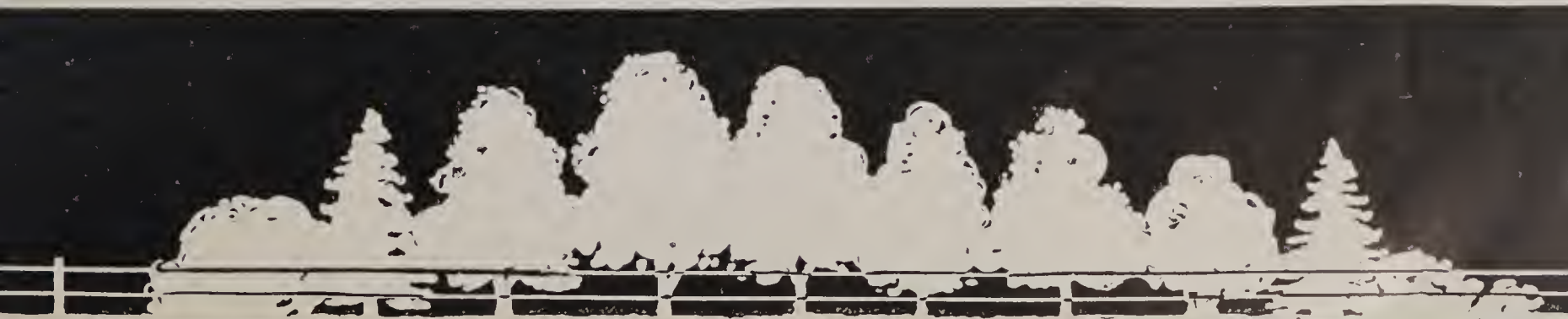


*Above: Planted in April 1935, these shelterbelts are the pride of their owners.*

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*Below: Cross-section diagram showing the plan of planting.*

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## From Nursery to

**N**URSERY stock for planting in the Plains region must be properly grown. The first step is to obtain the right kind of seed. In the Forest Service nurseries operated in the six States in which work of the Prairie States Forestry Project is carried on, local seed is used. Most of the seed for planting is collected by Forest Service employees. Over a period of many generations, trees, like other organisms, develop characteristics which fit them for the local environment in which they live but which may not fit them for another environment. Planting stock for a given locality should therefore be produced from seed taken from trees growing

Top: Chinese elm seedlings  
3½ months old in the Proj-  
ect nursery, Enderlin, N. Dak.

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Circle: Root development  
on Tartarian honeysuckle 4  
months old.

350974

Right: After one season's  
nursery growth the seedlings  
are dug for transplanting to  
the field.

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# Field Planting



under conditions as nearly identical as possible to those that the planted (young) trees must endure. Also, planting stock must be properly grown and carefully planted.

Because of widely different conditions in various areas, the shelterbelts are not of rigidly fixed width or orientation. The number of rows of trees in the strips varies with the local conditions. One general characteristic is ordinarily true of all strips; they are flanked at least on the windward side with shrubs or low-branching trees to form a wind barrier from the ground line up. It is estimated that about  $8\frac{1}{2}$  acres of trees, planted according to proper pattern, will give protection to the average 160-acre farm.



*Top: Field planting is done by hand in the spring.*

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*Circle: Sites for the shelterbelts are not always the most favorable. Note how trees in background have survived in this blow sand.*

349401

*Left: Despite severe droughts, 1935 and 1936 plantings have developed into healthy windbreaks.*

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## These Trees



**P**REPARATION of the ground before planting and cultivation during the first few years of a tree's life are vitally important in the prairie-Plains area. A planting of trees will not take care of itself any better than will a crop of corn. Weed growth is rapid and the weeds deprive the trees of needed soil moisture. Cultivation eliminates weed growth and leaves the ground in proper condition to absorb and hold rainfall.

*Top: Ground contoured with furrow-damming plow for shelterbelt on the M. M. Jacobs farm, Oklahoma.*

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*Left: Note pheasants lower left corner.*

349392



*Left: Going after the weeds with a hoe.*

350980





## Get Good Care

The most successful shelterbelts are those which have been well cultivated from the time of planting. An early start and a right start are important. Cultivation of the shelterbelts is performed by hand, or with teams, or tractors, according to the equipment available. At the last cultivation in late summer, a band of weeds is sometimes left between the rows of trees to prevent loose soil from blowing during the winter and early spring.

*Top: Cultivation of the young trees contributes to their successful growth.* 351010

*Right: After 3 or 4 years, cultivation between rows is no longer necessary.* 351001



*Right: Those conifers are coming along fine.* 351020







# Less Than 3 Years They're 20 to 30

*Left: This shelterbelt on the C. J. Bower farm in Bon Homme County, S. Dak., was planted in the spring of 1935.*

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*Right: H. Schulte is proud of this shelterbelt composed of cottonwoods, Chinese and American elms, green ash, Russian olive, and caragana.*

351018

*Below: These trees on the E. O. Barnes farm in South Dakota had a maximum height of about 24 feet after 3 seasons' growth.*

351003



**T**HE cottonwood is the State tree of Kansas. Many millions of cottonwoods have been planted in the Prairie States Forestry Project by the Forest Service.

Other species of trees suited to shelterbelt planting, and used in sections for which they are adapted, are green ash, Chinese and American elms, Osage-orange, hackberry, black locust, honeylocust, Russian olive, catalpa, tamarisk, willows, chokecherry, ponderosa and Austrian pines, blue spruce, and many others adapted to the different localities.



# Old — But Feet Tall



Right: Looking over the shelterbelt on the Ed Logue farm, 9 miles northwest of Pratt, Kans., planted in the spring of 1935.

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Left: Trees on the Howard farm in Nebraska are spreading out and in another season or two will completely shade the ground.

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Below: Desert willows on the E. A. Kirk farm, Greer County, Okla., furnished a crop of seed the next year after planting.

349411

The plantings of the Prairie States Forestry Project have been markedly successful. Thus Clarence J. Bower, commissioner of the third district of Bon Homme County, S. Dak., writes under date of June 6, 1937:

In the spring of 1936 the Forest Service gave this county about 24 miles of trees. It was the driest year ever experienced in this area. My strip came out this spring with an average of 92 percent living trees. Now, there is not a day that I am not asked why we do not get more trees in this county.







# A Better Place

SHELTER and shade for humans and for stock, nesting places for birds that are so useful in the destruction of insect pests, protective cover for game birds and animals—all these follow directly after the successful establishment of shelterbelts of trees.

The esthetic value of the long belts of trees in an area which for innumerable decades has been treeless is immeasurable. Their presence instills a sense of comfort. They stand out like sentinels, at once a sign of stability and an indication of pride in ownership. Early settlers on the Plains recognized the value of trees. As early as 1880 the Kansas Horticultural Society in its annual report said: "Those settlers who planted shelterbelts and groves are fixtures on their land while those who never planted trees have pulled up stakes and gone elsewhere."

Wind erosion in the prairie-Plains region now constitutes one of the greatest threats to successful agriculture and is a menace to comfortable living. Spectacular blow-outs are not the only source of danger, for steady winds of fairly high velocity take their toll from the fertile topsoil. In so doing the winds not only reduce the income-producing capacity of the lands but also contribute to the discomfort of both man and beast. The effect of a windbreak or shelterbelt is to check the velocity of air movement and create a protected zone extending approximately 20 times as wide as the trees are high.

North Dakota is the center of the greatest spring wheat-producing area of the United States. South Dakota, with a longer growing season, has general farming, with such crops as corn and feed grains. In Nebraska corn is important and much hay is raised near the sand hills. In much of Kansas no other crop approaches winter wheat in importance. In Oklahoma and northern Texas cotton is produced on a large scale. All these crops are susceptible to benefits from shelterbelts.

*Left: In the shade of a young cottonwood, Russell Parker finds relief from a blazing sun. This shelterbelt, one-half mile south of Trousdale, Kans., was planted in the spring of 1935.*



# in Which to Live



Top: Donald and Ludene get a lot of pleasure eating watermelon in the shade of their daddy's shelterbelt on the J. E. Williams farm in Oklahoma.

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Above: Birds are already nesting in the trees on the A. C. Bowker farm near St. John, Kans.

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Right: A. W. Becker's little boy inspects his father's shelterbelt near Columbia, S. Dak.

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# One Man's



EARLY in 1935 many farmers in the Plains regions were about ready to give up the battle with the winds. Ed Casey, who farmed near Mitchell, S. Dak., was one of these. He had seriously considered abandonment of his farm and the possibility of moving his family to the Pacific Northwest.

The shelterbelt planting of the Prairie States Forestry Project, and its purposes, were explained to Mr. Casey and he agreed to assist and cooperate in the work. A shelterbelt planting was then made on his farm.

*Upper left: Representatives of the Forest Service standing at one corner of the Ed Casey farm early in 1935 viewing the shifting sand piled by winds.*

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*Below: Here are cottonwoods on the Casey farm 2 years after planting.*

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# Experience



The photographs on this double page tell the story of the planting, done in April 1935. In preparing part of the area for planting, workmen found fences that had been completely buried by the drifting soil.

When Assistant Chief E. W. Tinker of the Forest Service visited the Casey farm in the summer of 1937, the proud owner praised the belt planted on his land. He told of reconsidering his previous plans to abandon the place and said that the change wrought by the protecting trees was the thing that influenced him to remain. Exhibiting watermelons he had grown on part of his farm where he had previously been unable to produce any kind of a crop, he told of the pleasure he and his family had enjoyed in picnicking in the shade of the trees. He remarked simply that South Dakota "sure looked good to him again," and that he was going to "stick around" and farm his land, knowing that his shelterbelt would temper the winds and give his land protection.

How well Casey's trees have established themselves is indicated by the fact that a cottonwood tree which was planted on his farm in April 1935 was cut down and exhibited at the 1937 State fair at Huron, S. Dak., as an example of the success achieved. This tree, which had been planted less than 3 years, was slightly more than 20 feet tall, and when measured with calipers showed a diameter of 5 inches.

The growth of the trees in the shelterbelt on Ed Casey's farm is not unusual. Farther south, in the prairie-Plains area in Oklahoma and Texas, trees planted in 1935 were producing a seed crop in 1936. Birds have built their nests in the new shelterbelts in Kansas, and pheasants have been found taking advantage of the cover furnished by the trees.

*Below: The Ed Casey family picnicking in the shelter of their tree strip on the farm which they had once planned to abandon. The watermelons were raised on parts of the farm where previously it had been impossible to raise anything.*

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*Near Isabel, Kans., Gartha Strahl, leader of a 4-H forestry club, inspects a shelterbelt planted in the spring of 1935.* 349396



TABLE 1.—*Trees and area planted in shelterbelts to May 1, 1938*<sup>1</sup>

State	Shelterbelt	Farms served	Trees planted	Area covered by plantings
	<i>Miles</i>	<i>Number</i>	<i>Number</i>	<i>Acres</i>
North Dakota.....	685	1,657	14,942,277	12,387
South Dakota.....	862	2,586	16,967,515	16,511
Nebraska.....	1,410	2,731	15,368,932	21,269
Kansas.....	1,201	2,364	13,538,521	18,111
Oklahoma.....	1,533	2,760	12,947,859	21,657
Texas.....	1,667	1,712	10,897,281	16,961
	6.858	13.810	84,662,385	106,895

## ALMOST 85 MILLION TREES

**T**REE planting is an essential element in the stabilization of agriculture in portions of the prairie-Plains region. The planting of field shelterbelts is not, however, a cure-all for all the ills—drought, crop failure, wind erosion, and the like—that from time to time have attended agriculture in various parts of that region, nor will trees survive on all soils and in all situations of this vast territory.

The greatest opportunity for planting of field shelterbelts, to serve as a means of benefiting crop production, is on those soils suited to tree growing that occur in the good agricultural land area lying east of the High Plains. In addition, however, there are many areas within the High Plains where soil and water conditions are satisfactory for field shelterbelts.

Successful tree plantings provide protection for crops, soil, stock, and game, and also make the prairies a better place in which to live; and although they do not obviate the need for proper cropping and soil management practices, they can be so integrated with them that these practices are made more effective.

The Prairie States Forestry Project discussed herein is an activity of the Forest Service, United States Department of Agriculture. The planting is being done in parts of the States of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas, where there are generally more moisture and less prohibitive conditions

for tree growth than in those parts of North Dakota, South Dakota, Montana, and Wyoming, where tree-planting work has been done by the Bureau of Plant Industry. Because of these differences the plantings are not directly comparable.

The first tree in the shelterbelt program of the prairie-Plains region was planted on March 19, 1935, on the farm of H. E. Curtis, near Mangum, Okla. During 1935, 5,615,183 trees were planted; the figure was increased to 18,155,878 trees planted in 1936, and during the spring of 1937 an additional 20,475,884 trees were planted. The estimated number of trees planted in the spring of 1938 is 49,415,440. Table 1 shows estimated total plantings to May 1, 1938.

The primary purpose of this tree-planting work on prairies and plains is to reduce the destructive effects of the winds. The broader aims are prevention of soil blowing, conservation of moisture, stabilizing the productiveness of the land, and making one of the most important agricultural regions of the Nation a better, more desirable place in which to live.

Detailed information and data on this tree-planting work may be secured by addressing the director, Prairie States Forestry Project, Sharp Building, Lincoln, Nebr.; or the Forest Service, United States Department of Agriculture, Washington, D. C.

<sup>1</sup> The figures include estimates of the 1938 spring plantings.



Through North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and in northern Texas in the situations more favorable to tree growth, the United States Forest Service is planting tree windbreaks and shelterbelts which temper the force of the western winds and furnish protection to an agricultural area that is naturally fertile and productive.



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